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DEVELOPMENT OF NEW FARM MACHINES IN THE USSR

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1952 Goal for Ministry

In 1951, the Ministry of Agricultural Machine Building increased the output, as compared with 1950, of basic agricultural machines, including: grain combines (especially self-propelled combines), cotton pickers, tractor planters, tractor cultivators, stubble-bottom plows, potato planters, potato diggers, self-propelled mowers, tractor mowers, and a number of other machines and implements.

Much has been accomplished in the field of mechanization, and in the third quarter 1951, 40 constant-flow lines, 45 assembly conveyers, and 25 intershop conveyers were put into operation, and a great number of machine tools were converted to high-speed cutting methods.

The main administrations for producing combines, cultivating machines, and animal husbandry machines, and a considerable portion of the enterprises producing other agricultural machines and implements fulfilled and exceeded their 1951 plan.

In 1951, the agricultural economy received more than 54,000 combines, 29,000 of them self-propelled; 10,000 cotton pickers; and more than 2 million other agricultural machines and implements.

In 1952, the agricultural machine building industry will be faced with the task of organizing the production of new, modern machines, including: corn-picking combines, silage combines, silage throwers, tractor two-gang bush and bog plows, more productive universal cotton cleaners, and number of other machines and implements.

The output of machines for mechanizing the cultivation of industrial crops must be increased sharply. The production, even in small series, of machines for mechanizing such tasks as sowing onions, pruning tea, etc. is very important.

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In 1952, plants of the Ministry of Agricultural Machine Building are to build and put into operation 50 new conveyers, 80 constant-flow lines, a number of automatic transfer machine lines, automatic temperature control instruments, and automatic control and sorting machines, and also to increase the number of machine tools operating by high-speed methods.

Of special importance in fulfilling the 1952 plan is an increase in the rate of output of existing production lines, and the creation of additional lines for making the most important mass-produced parts, such as shares and moldboards for tractor plows, segments, bushings, pins, links, drum teeth, cultivator teeth, and colters. With these additional lines, the plan for these parts can be fulfilled and exceeded, and the demand for spare parts can be met.

In 1951 a number of plants of the Ministry of Agricultural Machine Building, including the Rostsel'mash Plant, the Stalino Plant imeni Oktyabr'skaya Revolyutsiya, the Belinsksel'mash Plant, and the Frunze Plant imeni Frunze overconsumed raw materials and fuel, showed considerable losses due to rejects, and did not make full use of the modern machinery with which they were equipped. Some enterprises, although fulfilling and exceeding the gross production plan, did not fulfill the state plan for the most important types of products.

In 1952, the industry must devote special attention to fulfilling the plan for the assigned products list and variety of types, and must not permit the antistate practice, followed by some enterprises, of exceeding the gross production plan by turning out secondary products above the plan, and at the same time failing to carry out the assignment for the production of the most important types of output.(1)

Failures of New Farm Machine Designs

In 1951, plant design bureaus and VISKhOM (All-Union Institute of Agricultural Machine Building) developed about 250 different designs for agricultural machines, and more than 180 of these designs were presented for state testing. More than 400 models of new machines made by organizations of the Ministry of Agricultural Machine Building were tested at USSR machine experimental stations in the 1951 season. More than 30 designs were recommended for experimental or large-series production.

Among the machines recommended for production were: tractor-mounted cultivator-fertilizers for sugar beet, kok-sagyz, and other crops, for use with U-2 and KDP-35 tractors; planters for checkrow planting of potatoes and for ordinary planting of vernalized potatoes; new narrow-row grain drills; a tractor reaper for hemp, Indian mallow (kanatnik), and jute; and tea-picking and pruning machines.

Machines developed in former years were also tested, including: the Stalinets-8 trailer combine, the SKhP-2.1 pneumatic cotton picker; the KU-2 corn-harvesting combine; the SK-1.2 silage combine, and tractor and horse kok-sagyz planters.

Special machines for new crops have been recommended for production, including machines for planting and harvesting peanuts and rice.

Along with the successes achieved in 1951, there were very serious shortcomings in the work of the Special Design Bureau, the State Special Design Bureau for Cotton, and VISKhOM. Chief among these were the lack of sufficient coordination between the special design bureaus at plants and VISKhOM; delays in the development of plans, programs, and methodology; lack of the proper technical criticism of machine projects and the lack of socialist criticism between individual special design bureaus and VISKhOM in building new machines. These shortcomings are responsible for the low percentage of new designs that are suitable for mass production. In 1950, only 37.5 percent of the machines tested were accepted for production, and in 1951 the anticipated percentage will

be slightly above 40 percent. Because of this high rejection rate, projects for very important machines, such as a grain combine for northern regions, a combine for new bast crops, and a set of machines for picking and cleaning cotton harvested after the frosts, have been put aside year after year.

The 1952 plan calls for 240 projects directly related to the planning of new machines. The keystone of this plan is the designing of machines that will mechanize the growing of industrial, kok-sagyz, cotton, and bast crops; and of the basic food and fodder crops. sugar-beet, corn, potatoes, and vegetable oil crops.

A considerable increase in work on machines for electrified farms, irrigation farming, shelter belt cultivation, turning over virgin soil, mechanizing the harvest of grain crops, and fodder procurement and processing is also provided for.

Also planned is a large group of new machines for industrial crops, among them planters for square hill-drop planting of corn and potatoes, cultivators for between-row and between-hill tilling of young crops, and new harvesting machines for corn, sunflower, castor plants, peanuts, sesame, sugar beets, cotton, kok-sagyz, flax, hemp, Indian mallow (kanatnik), jute, mint, lavender, tobacco, hops, and tea.

Combines for harvesting tall-stalk and heavy-yield grain crops, chaff and straw stackers with a straw compressor, a straw harvesting machine, highly productive blowers for delivering grain to the threshing floor, and grain-cleaning and grain-drying aggregates should also be built.

For the mechanization of animal husbandry, highly productive mowers, rakes, sweep rakes, hay stackers, rickers, harvesters for root fodder crops, mixers for malted and steamed fodder, silage rammers and unloaders, fodder-preparing aggregates, and a set of machines for fodder sheds on animal husbandry farms are needed.(2)

Work of Cultivator-Planter Enterprises

Cultivating and planting machine plants of the Ministry of Agricultural Machine Building exceeded the 1951 production plan and raised commodity output 25 percent. A considerable increase in output, compared with 1950, was achieved in the most important types of products: tractor plows, tractor planters, and cultivators; 385,000 cultivating and planting machines were produced in 1951.

In 1951, 35 types of new and improved machines were put into production and models of more than 100 experimental machines were built.

The Altaysel'mash Plant and the Rostov-on-Don Krasnyy Aksay Plant worked well in 1951.

Although the Chirchiksel'mash and Uzbeksel'mash plants, failed to fulfill the plan for their products list, they improved their work in comparison with 1950. The Chirchiksel'mash Plant made up its deficit in the production of universal ditchers at the end of 1951. The Uzbeksel'mash Plant fulfilled the plans for sprayers and tractor-mounted ditchers.

At the same time, a number of plants failed to fulfill the plan for the products list: the Tashsel'mash Plant imeni Voroshilov failed to fulfill the plan for four types of machines, the Ryazsel'mash Plant failed to fulfill the plan for four types of machines including cultivators, and the Belinsksel'mash Plant failed to fulfil the plan for eight types of machines, including tractor

planters. The Belinsksel'mash Plant should take decisive measures to eliminate machine tool stoppages, violations of labor discipline, and deviations from established technological practice.

In the field of new technology, the Rostov-on-Don Krasnyy Aksay Plant has mechanized the cultivator shop and put intershop conveyers into operation; the Altaysel'mash Plant has mechanized the plow frame shop, using electric contact and other equipment; the Krasnaya Zvezda Plant has set up conveyers for assembling saw boxes and diskcolters, and has organized the production of extra-hard iron; and the Ryazsel'mash plant has set up and put into operation painting-drying conveyers.

In 1951, the following equipment was put into operation at cultivating and planting machine plants. 22 conveyers, 39 constant-flow lines, five inter-shop conveyers, 35 combination machine tools, ten high-frequency-current units, and 12 electrical erosion units.

The Altaysel'mash Plant and the Stalino Plant imeni Oktyabr'skaya Revolyutsiya failed to put shot-blasting units into operation and the Stalino Plant imeni Oktyabr'skaya Revolyutsiya has not completely organized intermittent rolling of chisel-shaped shares.

A number of plants are not controlling the quality of finished products. At the Belinsksel'mash Plant, losses due to rejects have risen to 4.5 percent of the cost of the finished product and losses due to rejects in the gray-iron foundry are as high as 20 percent. Finished planters have been returned for repair because of careless handling and faulty welding of units at the Belinsksel'mash Plant.

At the Dnepropetrovsk Plant imeni Voroshilov, the number of complaints and the losses due to rejects have increased in 1951 as compared with 1950 because the Division of Technical Control failed to fulfill its function, and because technical improvements were not carried out.

The quality of finished products has improved and the number of complaints and losses due to rejects have been reduced at the Plant imeni Oktyabr'skaya Revolyutsiya.

In 1952, plants of Glavpochvomash (Main Administration of Cultivating Machines) face increased obligations. The production plan is 118 percent, the plan for tractor planters is 115.8 percent, and the plan for tractor cultivators is 111.3 percent of the 1951 plan. The production plan for cultivators for the Rostov-on-Don Krasnyy Aksay plant has been more than doubled. The Rostov-on-Don Krasnyy Aksay Plant is to convert its basic shops to the mass production of new, wider cultivators in 1952.

The Kirovograd Krasnaya Zvezda Plant must build a series of machines for sowing onions and kok-sagyz, and build "gumbrinovaya" planters; the Rostov-on-Don Krasnyy Aksay Plant must build a three-section forest cultivator; the Stalino Plant imeni Oktyabr'skaya Revolyutsiya must build a two-gang bush and bog plow, and also tractor-mounted plows; and the Ryazsel'mash Plant must produce potato planters for square hill-drop planting.

In 1952 there should be further mechanization of labor-consuming tasks. The Altaysel'mash Plant and the Stalino Plant imeni Oktyabrskaya Revolyutciya should set up automatic lines for producing shares and moldboards; the Kirovograd Krasnaya Zvezda Plant should convert to automatic methods of producing metal ware; plow plants should adopt intermittent rolling; and the Rostov-on-Don Krasnyy Aksay Plant should adopt semiautomatic welding under a layer of flux and a unit for electric hardening of the working members of cultivators.

Best production results are obtained by those plants, such as the Rostov-on-Don Krasnyy Aksay and Altaysel'mash plants, which fulfill their daily norms, and as a result, frequently place first in socialist competitions. On the other hand, enterprises like the Belinsksel'mash and Ryazsel'mash plants, which fail to fulfill their norms on the very first days of the month, often fail to fulfill their monthly norms for the products list of agricultural machines and spare parts. -- N. A. Sarkisov, Chief of Glavpochvomash, Ministry of Agricultural Machine Building USSR (3)

Quality in Agricultural Machine Building

The plants of the Ministry of Agricultural Machine Building still devote insufficient attention to the quality of their products. In 1951, 11.2 percent of the finished machines were returned to plants of the ministry by consumers for correction of defects. The percentage of rejects in ntermediate operations was also intolerably high.

Ministry plants had the following percentages of defective castings: Lyubertsy Plant imeni Ukhtomskiy, 7.3; Rostsel'mash Plant, 6.7; Gomsel'mash Plant, 11; Ryazsel'mash Plant, 6.7; Belinsksel'mash Plant, 13.2; Uzbeksel'mash Plant, 10.1; and the Kurgansel'mash Plant, 11.1. In 1951, ministry plants received a number of complaints from consumers, testifying to the lack of rigid inspection and unsatisfactory work of the divisions of technical control at the plants.

The great demand for spare parts can be accounted for not only by the heavy work load during the season, but also by the insufficient wear resistance of working parts, and of other parts and mechanisms which are subject to wear. For this reason, scientific research institutions, special design bureaus, and Ministry of Agricultural Machine Building plants should study the wear resistance of parts and review the technical basis of consumption norms for spare parts.

Defects in agricultural machines are mainly attributable to the following causes:

1. Violation of the prescribed technological process for making the part or the machine as a whole.

2. Deviations from the dimensions, tolerances, and specifications indicated in the blueprints.

3. The absence of strict control over each operation involved in making parts and assembling units and machines.

In July 1951, the Ministry of Agricultural Machine Building set up rules for developing and confirming technological processes, and rules for checking on the observance of technological discipline in plants. These rules require a fixed technological process for every part of a machine and forbid deviations or arbitrary changes. However, the rules for working out the technological process are still inadequate.

In July 1951, rules for confirming blueprints for agricultural machines and their parts were also set up. In these rules, the ministry prohibited any changes in the established blueprints of a series-produced article unless the change would improve the part or the process. Any such changes must be reported within a certain period on a special form.

Blueprints for agricultural machines lack exhaustive data on the qualitative indexes of parts, or if they have such data, it is not expressed in concrete terms. For example, the blueprints for the S-4 self-propelled combine, drawn up by the Special Design Bureau of the Novaya Tula Plant, lack specifications (for some of the parts) defining the qualitative indexes of elements making up the parts.

In many cases, the blueprints lack linear tolerances for the basic dimensions of parts, and unit blueprints are drawn without taking into account dimensional relationships and tolerances. This makes it impossible for workers of the OTK (Division of Technical Control) to maintain full control of the dimensions of each individual part, and, as a result, individual parts with incorrect dimensions complicate or make impossible uninterrupted assembly of units.

Specifications for agricultural machines are often unclear or obsolete. These specifications should be reviewed and their qualitative indexes made more explicit and more binding.

OTK are not sufficiently exacting about the observance of qualitative norms. At some enterprises, the OTK is not fully equipped with control and measuring instruments. For example, the Kazaksel'mash Plant has only 86 percent of the control and measuring instruments necessary for the inspection of GPT-14.5 tractor rakes, the Gomsel'mash Plant has only 80 percent of the instruments required to inspect RSS-6 chaff and silo cutters, and the L'vovsel'mash plant has only 65 percent of the instruments needed for inspecting the EK-05 fodder steamer.

Measuring standards are not always properly checked. There have been cases where gauge blocks were checked with an ordinary micrometer. The personnel of the OTK is not always fully trained, and classes for raising their qualification have not been organized.

However, faulty machines cannot always be attributed to control units, since they sometimes result from poor designing. Designers should think out in advance the productive processes for each part and even each element of the machine. In the production process, the drive for quality should start with control of the initial material, and be followed through with checks on the accuracy of equipment, patterns, stamps, fittings, tools, and measuring equipment. The plant control and measurements laboratories should play a greater part in this work.(4)

Wider Use of New Production Processes

The use of special and combination machine tools in the production of agricultural machines has increased the potential output of parts, improved their quality, and reduced their labor consumption. For example, at the Voronezhsel'mash Plant, the use of a multispindle, automatic machine tool speeded up the machining of cylinders for grain cleaners and graders seven to eight times. The Altaysel'mash Plant has adopted the design of an electric contact unit for heating parts, such as beams for tractor plows, prior to bending.

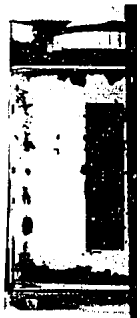
The Rostsel'mash, Ryazsel'mash, and Altaysel'mash plants use electric contact heating in the stamping of metalware. At the Tashsel'mash Plant, iron-ceramic bushings, replacing bronze bushings, are used in cotton pickers. The Khar'kov Serp i Molot Plant shot blast hardens valve springs for the U5M combine engine.

High-frequency current units are widely used for hardening parts, and are used exclusively in the hardening of cutting elements.

Since 1948-1949, electric riveting has been used in combine production, increasing productivity eight to ten times compared with mechanical riveting.

New production materials developed by scientific research work are being used, including: three-ply steel for moldboards, iron-ceramic material for bushings, glued wood for trailer combine beds, and other materials.

The Stalino Plant imeni Oktyabr'skaya Revolyutsiya now rolls sheet iron directly from /molten/ iron. The use of machine molding has been increased considerably at all enterprises of the ministry. The Taganrog Plant produces stamped hook



chains from steel strip. At the Frunze Plant imeni Frunze, cylinders for grain cleaners and graders are now stamped out of steel.

In many foundries, the output of castings is limited by the capacity of the cleaning department. Moreover, shot-blast cleaning units have not even been completed at the Altaysel'mash and Rostsel'mash plants, the Taganrog Combine Plant, and the Stalino Plant imeni Oktyabr'skaya Revolyutsiya.

The Tula Combine Plant has not yet started casting iron parts in permanent molds. The Pervomaysk Plant has not set up a unit for preheating air for cupola furnaces in making shovel iron.

Electric contact units for heating parts prior to stamping and bending are not fully utilized at the Stalino Plant imeni Oktyabr'skaya Revolyutsiya, the Tula Combine Plant, and other plants.

Metal-cutting equipment is not being modernized rapidly enough and plants are making insufficient use of cutters with mechanically attached hard-alloy elements.

Technological measures promoting greater wear resistance of agricultural machines should be used in production. These include the use of modified and superhard iron; the production of stamped and welded thin-walled parts; better heat treatment of cutting parts -- shares, cultivator sweeps, shovels, and points, and harvester knife sections; hardening of iron parts; coating cutting parts with hard alloy; replacing nonferrous metals with iron-ceramic materials; and improving welded joints by using automatic and semiautomatic welding.(5)

Plan Failure in Forage Machine Building

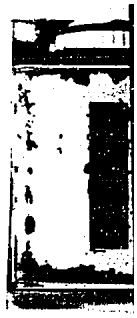
In the postwar period, the output of machines for preparing forage and for mechanizing labor-consuming tasks in animal husbandry has increased more than eight times compared with 1940.

In the first quarter of 1952, a conference of leading workers of plants and special design bureaus of the Main Administration for the Production of Machines for Animal Husbandry was held, which, while noting the growth in output, also scored shortcomings in the work of the plants, the special design bureaus, and the main administration.

Plants of the main administration showed the following gains [in 1951 over 1950]: gross production, 33.2 percent; commodity output, 44 percent; agricultural machine output, 49 percent; and output of spare parts for agricultural machines, 53.5 percent. Labor productivity increased 28 percent and production costs were reduced 17.7 percent.

In 1951, 46 constant-flow lines were built; 7 conveyers, 66 special and combination machine tools, and three high-frequency units were put into operation; and the number of machine tools operating on high-speed cutting methods was increased 40 percent in plants of the main administration. The degree of mechanization in mixing molding and core materials has been raised to 87.5 percent; in cleaning and cutting off castings, to 94.5 percent; and the proportion of machine molding, t 86 percent. More than 2,000 workers took part in the rationalization program and the calculated savings resulting from their innovations amounted to more than 20 million rubles.

However, in the main administration as a whole, the 1951 production plan was not fulfilled. Of 72 models of machines produced, the plan for 12 was not fulfilled. The Kazakhsel'mash Plant, the Pervomaysk Plant, and the Frunze Plant imeni Frunze have fallen far behind in their production quotas. A number of plants have not yet provided dies, fittings, and tools for production (Gomsel'mash,



Pervomaysk, and other plants). At many plants, the level of mechanization of loading and unloading operations is very low; 28 percent in railroad transport, and 11.2 percent in motor transport.

Measures for economizing on raw and other materials have not been carried out. In 1951, the Frunze Plant imeni Frunze overconsumed 5.7 percent bar stock, 14.5 percent coke, and 36 percent lumber; the Bezhetsksel'mash Plant overconsumed bar stock 11.3 percent.

The percentage of gross production lost because of rejects was 2.1 percent, and 10.7 percent of the machines had to be returned by representatives of the Ministry of Agriculture to have defects corrected. The Frunze Plant imeni Frunze, the Kazakhsel'mash Plant, and the Lyubertsy Plant imeni Ukhtomskiy have permitted especially large losses due to rejects.

The special design bureaus of the main administration have fallen behind schedule in building and presenting for state testing new machines, such as hay stackers (Special Design Bureau, Lyubertsy Plant imeni Ukhtomskiy), and silage combines (Special Design Bureau, Gomsel'mash Plant). These shortcomings must be eliminated in 1952, and the Special Design Bureau of the Plant imeni Ukhtomskiy must prepare for state testing models of lightened hay stackers, both crane type and elevator type, sweep rakes, haystack wagons, and also hay mowers for the DT-54 and KhTZ-7 tractors.

The Special Design Bureau of the Gomsel'mash Plant must build and present for state testing a silage unloader, a silage mixer, fodder mixers, mobile milking units for field milking, fodder mixers, mobile milking units for field milking, fodder-processing aggregates for hog farms, and a number of other machines for animal husbandry farms.

Plants of the main administration must increase gross production 20.2 percent, raise labor productivity 14.5 percent, and reduce production costs 17.6 percent. They must also organize the series production of nine machines not formerly produced by the plants concerned, including well diggers for animal husbandry farms, two-horse rakes, and tractor sweep rakes, and also prepare to produce crane hay stackers.

The Frunze Plant imeni Frunze and the Kazakhsel'mash, Bezhetsksel'mash, and Pervomaysk plants must build and put into operation painting and drying aggregates. The Lyubertsy Plant imeni Uktomskiy and the Pervomaysk Plant must build additional chambers for drying wood. The Plant imeni Frunze must complete and put into operation a highly mechanized gray-iron foundry.

To enable the enterprises of the main administration to fulfill the 1952 plan, the branch conference decided to increase the number of machine tools operating on high-speed methods, to raise the level of mechanization of work in rail transport, to utilize the experience of the L'vovsel'mash Plant in automatic welding at other plants, especially at the Lyubertsy Plant imeni Ukhtomskiy, to take measures to promote widespread mechanization of hand tools, to expand the products list of restorable tools, and to organize tool-grinding shops at all plants.

Castings output must be improved by strict control of equipment and by organizing sections for salvaging defective castings, by using shotblast cleaning, and by utilizing the experience of the Pervomaysk Plant in using manganiferous ores instead of mirror iron.(6)

New Machines

Enterprises of the Ministry of Agricultural Machine Building USSR are organizing the series production of a number of new machines for grain and industrial crops in 1952.

The Tula Combine Plant has started the production of an improved self-propelled combine for harvesting tall-stalk grain crops, and will make hundreds of these machines in 1952. The combines will harvest up to 2 hectares of grain per hour.

At the same time, work is being carried out to improve all self-propelled combines, especially in such operations as loading grain while in motion and gathering chaff and straw by means of tractor-mounted stackers.

The Rostsel'mash Plant is preparing to series produce corn harvesters which will snap off the ears of corn, husk them, and also chop the stalks and pile them up at the edges of the field. This trailer harvester is pulled by the KDP-35 ractor, harvests 0.6 hectare of corn per hour, and can be used with row widths of 70 and 90 centimeters.

The Bezhetsksel'mash Plant has shipped large consignments of complex flax threshers with a productivity of 2.5 tons of seeds per hour. The machine has an automatic machanism for feeding the sheaves and an improved seed-cleaning unit.

Among the new machines put out by ministry plants are a bush and bog harrow and a vegetable planter.

In 1952, 200 new machines built by designers of the ministry will be field tested.(7)

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